

WHAT IS CLAIMED IS:

1. An asymmetric light emitting structure for producing polarized light, comprising:
 - a) a light emitting layer having a plurality of light emitting species, wherein orientation of the light emitting species is uncontrolled;
 - b) an asymmetric geometric element that receives emitted light from the light emitting layer and produces polarized light; and
 - c) means for excitation of the light emitting layer.
2. The asymmetric light emitting structure claimed in claim 1, wherein the light emitting layer is comprised of materials selected from the group consisting of organic light emitting materials and inorganic light emitting materials.
3. The asymmetric light emitting structure claimed in claim 2, wherein the organic light emitting materials includes materials selected from the group consisting of polymers and dyes.
4. The asymmetric light emitting structure claimed in claim 2, wherein the inorganic light emitting materials includes materials selected from the group consisting of compounds from the periodic table found in group II, group VI, group III, and group V, and semi-conducting quantum dots fabricated from these same groups.
5. The asymmetric light emitting structure claimed in claim 1, wherein the asymmetric geometric element is a vertical cavity surface emitting laser with asymmetric lateral confinement.
6. The asymmetric light emitting structure claimed in claim 5, wherein the vertical cavity surface emitting laser is organic.

7. The asymmetric light emitting structure claimed in claim 5, wherein the vertical cavity surface emitting laser is inorganic.

8. The asymmetric light emitting structure claimed in claim 1, wherein the asymmetric geometric element is a grating.

9. The asymmetric light emitting structure claimed in claim 8, wherein the grating improves surface plasmon light output coupling.

10. The asymmetric light emitting structure claimed in claim 1, wherein the asymmetric geometric element is a photonic crystal with asymmetric lateral confinement.

11. The asymmetric light emitting structure claimed in claim 1, wherein the light emitting layer emits white light.

12. A flat-panel display comprising;
a) a light emitting layer having a plurality of light emitting species, wherein orientation of the light emitting species is uncontrolled;
b) an asymmetric geometric element that receives emitted light from the light emitting layer and produces polarized laser light;
c) a light excitation layer for exciting the light emitting layer; and
d) a liquid crystal adapted to switch between a transmissive state in which the polarized light is transmitted through the liquid crystal and a non-transmissive state in which the polarized laser light is not transmitted through the liquid crystal.

13. The flat-panel display claimed in claim 12, further including:

- a) an optically transparent, insulating planarization layer;
- b) wherein the light excitation layer further includes;

i) a first transparent electrode located on one side of the optically transparent, insulating planarization layer;

ii) a pump layer adjacent to the first transparent electrode to produce a pump beam light which is transmitted out of light excitation layer through the first transparent electrode and the optically transparent, insulating planarization layer; and

iii) a second electrode adjacent to the pump layer;

c) wherein a vertical laser cavity structure is located on the other side of the optically transparent, insulating planarization layer and disposed to receive the pump beam light transmitted from the light excitation layer through the optically transparent, insulating planarization layer, such structure including:

i) first means for receiving light from the light excitation layer and being mainly transmissive or reflective over predetermined ranges of wavelengths;

ii) an organic active layer for receiving light from the light excitation layer and from the first light-receiving means and for producing laser light; and

iii) second means for reflecting light from the organic active layer back into the organic active layer, wherein a combination of the first means and the second means for receiving light transmits the polarized laser light.

14. The flat-panel display claimed in claim 13, wherein the vertical cavity laser structure is arranged as groups and wherein each group has a common spatial separation and emit same-colored, mode-locked light.

15. A flat-panel display comprising;

a) a substrate;

b) a periodic grating structure formed over the substrate;

c) a first electrode layer formed over the periodic grating structure and conforming to the grating structure;

d) an OLED layer formed over the first electrode layer and conforming to the grating structure;

e) a second electrode layer formed over the OLED layer and conforming to the grating structure, wherein the first and/or second electrode layers are metallic layers, whereby the periodic grating structure induces surface plasmon cross coupling in the metallic electrode layer(s); and

f) a liquid crystal adapted to switch between a transmissive state in which the polarized light is transmitted through the liquid crystal and a non-transmissive state in which the polarized OLED light is not transmitted through the liquid crystal.

16. The flat-panel display claimed in claim 15, wherein the substrate is a transparent, protective coating.

17. The flat-panel display claimed in claim 12 wherein the liquid crystal further comprises:

i) a first liquid crystal electrode and a second liquid crystal electrode; and

ii) a layer of liquid crystal material located between the first and the second liquid crystal electrodes such that when an electrical field is not applied by the first and the second liquid crystal electrodes the liquid crystal material does not transmit polarized light and when an electrical field is applied by the first and the second liquid crystal electrodes the liquid crystal material does transmit polarized light.

18. The flat-panel display claimed in claim 17, wherein the first and the second liquid crystal electrodes form independently controllable pixels.

19. The flat-panel display claimed in claim 18, wherein the light emitting layer further comprises a plurality of light emitters that emit light in different colors and wherein the different colored light emitters are aligned with the independently controllable pixels.

20. The flat-panel display claimed in claim 18, wherein the light emitting layer emits white light and further comprising a plurality of color filter arrays aligned with the independently controllable pixels.

21. The flat-panel display claimed in claim 18, wherein the light emitting layer comprises independently controllable pixels.

22. A display system comprising:

- a) a light emitter for emitting incoherent light;
- b) an organic vertical cavity laser adapted to receive the incoherent light and to emit laser light polarized in a first direction in response to the incoherent light;
- c) a liquid crystal adapted to switch between a transmissive state in which the polarized laser light is transmitted through the liquid crystal and a non-transmissive state in which the polarized laser light is not transmitted through the liquid crystal; and
- d) a controller for controlling the light emitters.

23. The display system claimed in claim 22 wherein the light emitters and the controller are integrated on a common substrate.

24. The flat-panel display claimed in claim 15 wherein the liquid crystal further comprises:

- i) a first liquid crystal electrode and a second liquid crystal electrode; and
- ii) a layer of liquid crystal material located between the first and the second liquid crystal electrodes such that when an electrical field is not applied by the first and the second liquid crystal electrodes the liquid crystal material does not transmit polarized light and when an electrical field is applied by the first and the second liquid crystal electrodes the liquid crystal material does transmit polarized light.

25. The flat-panel display claimed in claim 15, wherein the first and the second liquid crystal electrodes form independently controllable pixels.

26. The flat-panel display claimed in claim 25, wherein the OLED layer further comprises a plurality of OLEDs that emit light in different colors and wherein the different colored OLEDs are aligned with the independently controllable pixels.

27. The flat-panel display claimed in claim 25, wherein the OLED layer emits white light and further comprising a plurality of color filter arrays aligned with the independently controllable pixels.

28. The flat-panel display claimed in claim 25, wherein the OLED layer comprises independently controllable pixels.

29. A display system comprising:

- a) a substrate;
- b) a periodic grating structure formed over the substrate;
- c) a first electrode layer formed over the periodic grating structure and conforming to the grating structure;
- d) an OLED layer formed over the first electrode layer and conforming to the grating structure;
- e) a second electrode layer formed over the OLED layer and conforming to the grating structure, wherein the first and/or second electrode layers are metallic layers, whereby the periodic grating structure induces surface plasmon cross coupling in the metallic electrode layer(s);
- f) a liquid crystal adapted to switch between a transmissive state in which the polarized laser light is transmitted through the liquid crystal and a non-transmissive state in which the polarized laser light is not transmitted through the liquid crystal; and
- g) a controller for controlling the light emitters.

30. The display system claimed in claim 29 wherein the light emitters and the controller are integrated on a common substrate.

31. A method for producing polarized laser light, comprising:
a) forming a light emitting layer having a plurality of light emitting species, wherein orientation of the light emitting species is uncontrolled;
b) forming a laterally asymmetric laser cavity structure that receives emitted light from the light emitting layer thereby producing polarized laser light; and
c) providing a means for excitation of the light emitting layer.

32. The method claimed in claim 31, wherein the laterally asymmetric laser cavity structure is a vertical cavity surface emitting laser with asymmetric lateral confinement.

33. The method claimed in claim 32, wherein the vertical cavity surface emitting laser is organic.

34. The method claimed in claim 32, wherein the vertical cavity surface emitting laser is inorganic.